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In The

Supreme Court of the United States

SLIP TRACK SYSTEMS, INC.,

Petitioner,

v.

METAL-LITE, INC.,

Respondent.

ON PETITION FOR WRIT OF CERTIORARI
TO THE UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

APPENDIX B
TO PETITION FOR WRIT OF CERTIORARI

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TABLE OF CONTENTS
APPENDIX B

Page

United States Patent
No. 5,127,203
Re: Paquette
issued July 7, 1992 ..... App. 1

United States Patent
No. 5,127,760
Re: Brady
issued July 7, 1992 ..... App. 5

Original Patent Application,
With Handwritten Changes and Notations,
filed July 26, 1990 ..... App. 11

US005127203A

United States Patent [19]

Paquette

[11] Patent Number: 5,127,203

[45] Date of Patent: Jul. 7, 1992

[54] SEISMIC/FIRE RESISTANT WALL STRUCTURE AND METHOD

[76] Inventor: Robert F. Paquette, 970 Edmonds Way, Sunnyvale, Calif. 94087

[21] Appl. No.: 668,760

[22] Filed: Mar. 14, 1991

Related U.S. Application Data

[63] Continuation of Ser. No. 477,620, Feb. 9, 1990, abandoned.

[51] Int. Cl.[5] E04H 1/00

[52] U.S. Cl. 52/241; 52/290; 52/481; 52/690

[58] Field of Search 52/241, 242, 290, 243, 52/481, 690, 238.1, 239, 36, 484

[56] References Cited

U.S. PATENT DOCUMENTS

1,729,439	9/1929	Gordez	52/241
3,017,672	1/1962	Vaughan	52/241
3,460,302	8/1969	Cooper	52/290 X
4,805,364	2/1989	Smolik	52/241

OTHER PUBLICATIONS

Sweets Catalog File, 1985, Seebion 6.6/sim, pp. 23-24.

Fire Resistant Design Manual, Gypsum Association, 1984, p. 5.

Primary Examiner—Richard E. Chilcot, Jr.

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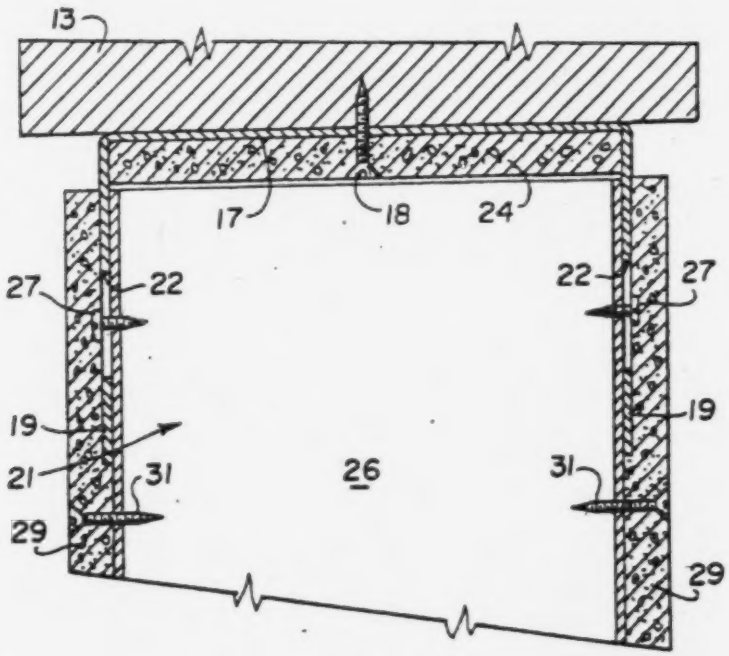
[57] ABSTRACT

Seismic and fire resistant wall structure and method in which a U-shaped channel member having vertically extending slotted openings in the side flanges thereof is mounted on the underside of a beam or other overhead structural member, with a layer of fire retardant material in the upper portion of the channel. Studs are connected to the channel member with fasteners which pass through the slotted openings and permit relative vertical movement between the channel member and the studs, while holding the studs in place horizontally. Fire retardant wallboard is attached to the opposing side faces of the studs and extends between the floor and the channel member.

9 Claims, 1 Drawing Sheet



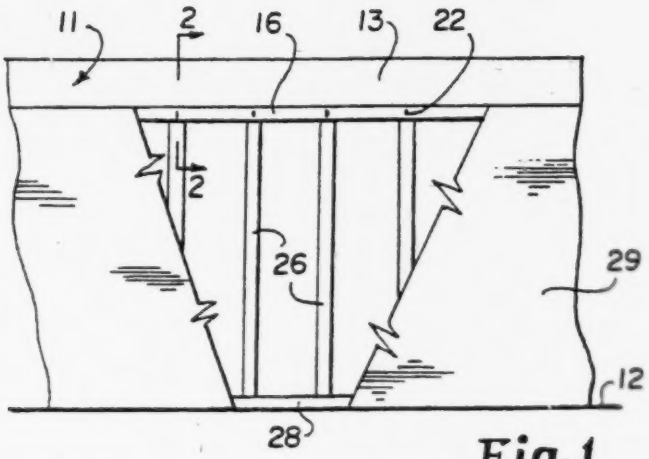


Fig.1

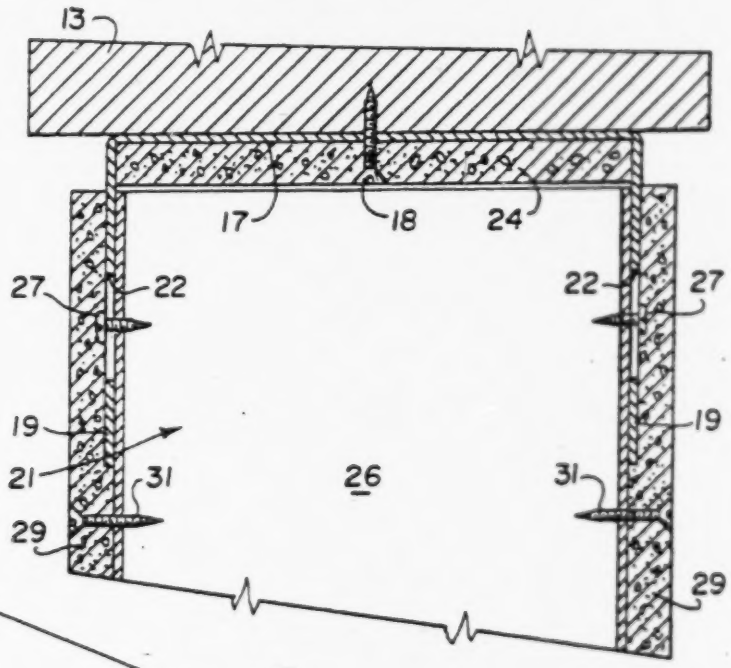


Fig.2

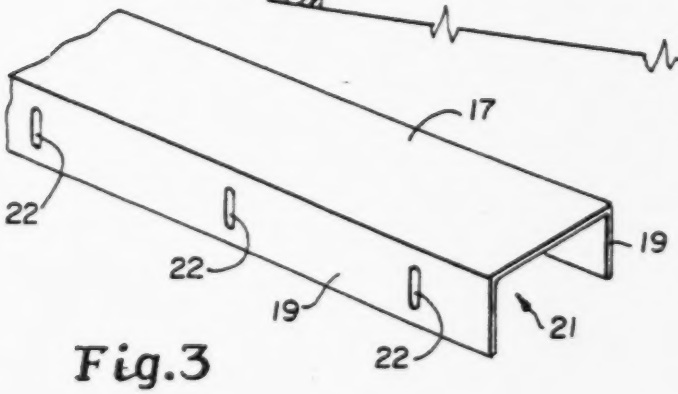


Fig.3

SEISMIC/FIRE RESISTANT WALL STRUCTURE AND METHOD

This is a continuation of application Ser. No. 07/477,620 filed Feb. 9, 1990, now abandoned.

This invention pertains generally to wall structures and, more particularly, to a seismic and fire resistant wall structure and method.

Full height non-bearing walls are commonly installed beneath overhead structural members such as roof beams, floor beams, and the like. Such members are commonly constructed in a laminated form commonly known as glue-laminated beams or "glue-lams" and provided with an upwardly convex curvature or crown so that the member will straighten out when subjected to normal loading, e.g. static loads, plastic flow and live loads. Even after the member has straightened out, it may still move because temperature changes, rain loads, and the like.

To accommodate movement of an overhead structural member, a flexible connection is employed between the member and the wall beneath the member. One such connection utilizes a so-called compression track in which the flanges which are connected to the wall studs are bent in bellows-like fashion and thus adapted to flex and permit movement between the structural member and the wall. When flexed, however, these tracks tend to fracture at the bends and fail.

Another flexible connection heretofore provided has a downwardly facing channel in which the upper portion of the wall is loosely received. There is no connection between the channel and the wall, and the wall can become dislodged from the channel if the lower portion of the wall is knocked out of position.

It is in general an object of the invention to provide a new and improved wall structure and method which overcome the limitations and disadvantages of wall structures heretofore provided.

Another object of the invention is to provide a wall structure and method of the above character in which the wall structure is resistant to both seismic loading and fire.

Another object of the invention is to provide a wall structure and method which can be employed economically.

These and other objects are achieved in accordance with the invention by providing an elongated channel member with a base, a pair of side flanges extending from the base and defining a channel, and a plurality of slotted openings at longitudinally spaced intervals in the side flanges, providing a layer of fire retardant material on the side of the base facing the channel, mounting the channel member on the under side of the overhead structural member with the channel opening in a downward direction, positioning a plurality of vertically extending studs between the floor and the channel member with the upper portions of the studs extending into the channel in alignment with the slotted openings, attaching the studs to the channel member with fasteners which pass through the slotted openings and into the studs and permit relative vertical movement between the channel member and the studs, and mounting fire retardant wallboard on opposing side faces of the studs between the floor and the channel member.

FIG. 1 is a fragmentary side elevational view of a wall structure incorporating the invention.

FIG. 2 is an enlarged cross-sectional view taken along line 2—2 in FIG. 1.

FIG. 3 is a fragmentary isometric view of the channel member utilizing the wall structure of FIG. 1.

As illustrated in FIG. 1, the wall structure 11 is a full height non-bearing wall which is installed between the floor 12 and an overhead structural member 13 such as a roof beam. A fire retardant ceiling 14 conventional construction extends horizontally at a level below the top of the wall.

The wall structure includes a U-shaped channel member 16 of fire resistant material, such as 18 gauge galvanized steel, which is affixed to the underside of beam 13 in an inverted position. The channel member includes a base 17 which is secured to the under side of the beam by screws 18, and a pair of generally parallel depending side flanges 19 which define a downwardly opening channel 21. For standard dimension walls, the channel typically has a width of 2½, 3½, 6 or 8 inches and a depth of about 1¼ inches.

A plurality of vertically elongated slotted openings 22 are formed in the side flanges at spaced intervals along the length of the channel member. These slots typically spaced on 8 inch centers, which accommodates standard stud spacings of 16 and 24 inches.

A layer of fire retardant material 24, such as drywall, is affixed to the under side of base 17 in the upper portion of channel 21. In one presently preferred embodiment, the drywall layer is ½ inch thick, and it is affixed to the base with an adhesive.

A plurality of studs 26 extend between the floor and the channel member, with the upper end portions of the studs being received in channel 21 and the upper ends of the studs being spaced about ¼ inch from the lower surface of the fire retardant material 24. The upper end portions of the studs are connected to the channel member by screws 27 which pass through slotted openings 22 and into the studs. The screws are left loose enough to permit them to move freely up and down in the slotted openings thus permit relative vertical movement between the studs and the channel member while anchoring the upper portions of the studs against horizontal movement. The lower ends of the studs are received in and affixed to a U-shaped channel member 28 which is affixed to the floor. In the embodiment illustrated, the studs and the lower channel member are fabricated of a fire resistant material such as metal, and the studs have a generally U-shaped contour in cross-section. If desired, however they can be fabricated of another suitable material, and if, for example, the studs are fabricated of wood, the lower channel can be replaced with a conventional wood floor plate.

Fire retardant wallboard 29 is mounted on the side faces of the studs and extends from the floor to the channel member and over the outside of side flanges 19. The upper edge of the wallboard is spaced about ¾ inch below the lower surface of beam 13 to permit vertical movement between the wall structure and the beam. Although the top ends of studs 26 are spaced only about ¼ below the lower surface of retardant material 24, they do not interfere with the movement between the studs and the channel member because they cut into the retardant material. If solid studs are used, they should terminate about ¾ inch below the retardant material since they will not cut into it as readily as the U-shaped metal studs. The wallboard is attached to the studs with screws 31, with no screws from the wallboard going

into the channel member to interfere with the movement of the studs.

The wall is constructed by mounting the channel member **16** on the under side of the beam, with the slotted openings **22** formed in the side flanges and the layer of fire retardant material **24** installed in the channel. The lower channel member **28** is affixed to the floor beneath the beam, and studs **26** are installed between the channel members in alignment with the slotted openings. The lower ends of the studs are secured to the lower channel member, and screws **27** are installed in the upper ends of the studs through the slotted openings, following which the Wallboard **29** is installed.

It is apparent from the foregoing that a new and improved wall structure and method have been provided. While only certain presently preferred embodiments have been described in detail, as will be apparent to those familiar with the art, certain changes and modifications can be made without departing from the scope of the invention as defined by the following claims.

I claim:

1. In a seismic/fire resistant wall structure installed between a floor and a overhead structural member:

an elongated channel member having a base affixed to the structural member and a pair of side flanges depending from the base and defining a downwardly opening channel;

a layer of fire retardant material extending along the base within the channel;

a plurality of vertically extending slotted openings in the side flanges at spaced intervals along the length of the channel member;

a plurality of studs extending vertically between the floor and the channel member with upper portions of the studs extending into the channel in alignment with the slotted openings;

fasteners passing through the slotted openings and into the studs to anchor the upper portions of the studs against horizontal movement but permitting relative vertical movement between the channel member and the studs; and

fire retardant wallboard mounted on the studs and extending from the floor to the channel member.

2. The wall structure of claim **1** wherein the channel member is fabricated of metal.

3. The wall structure of claim **1** wherein the fire retardant material extending along the base of the channel member is wallboard.

4. The wall structure of claim **1** wherein the studs are fabricated of metal.

5. A U-shaped channel member for use in a seismic/fire resistant wall structure having a plurality of studs extending between a floor and an overhead structural member, with wallboard mounted on opposing side faces of the studs and fasteners connecting upper end portions of the studs to the channel member, said channel member having a base adapted to be fixed to the structural member, a pair of side flanges extending from the base and defining a channel for receiving the upper end portions of the studs, and a plurality of slotted openings formed at longitudinally spaced intervals in the side flanges for receiving the fasteners and permitting relative vertical movement between the channel member and the studs.

6. The channel member of claim **5** including a layer of fire retardant material extending along the side of the base within the channel.

7. The channel member of claim **5** wherein said channel member is fabricated of metal.

8. In a method of constructing a seismic/fire resistant wall structure between a floor and an overhead structural member, the steps of:

providing an elongated channel member with a base, a pair of side flanges extending from the base and defining a channel, and a plurality of slotted openings at longitudinally spaced intervals in the side flanges;

providing a layer of fire retardant material within the channel;

mounting the channel member on the overhead structural member with the channel opening in a downward direction;

positioning a plurality of vertically extending studs between the floor and the channel member with upper portions of the studs extending into the channel in alignment with the slotted openings;

attaching the studs to the channel member with fasteners which pass through the slotted openings and into the studs and permit relative vertical movement between the channel member and the studs so that the studs will not be affected by movement of the overhead structural member on which the channel member is mounted; and

mounting fire retardant wallboard on the studs between the floor and the channel member.

9. In a seismic wall structure installed between a floor and an overhead structural member:

an elongated channel member having a base affixed to the structural member and a pair of side flanges depending from the base and defining a downwardly opening channel;

a plurality of vertically extending slotted openings in the side flanges at spaced intervals along the length of the channel member;

a plurality of studs extending vertically between the floor and the channel member with upper portions of the studs extending into the channel in alignment with the slotted openings;

fasteners passing through the slotted openings and into the studs to anchor the upper portions of the studs against horizontal movement but permitting relative vertical movement between the channel member and the studs; and

wallboard mounted on the studs and extending from the floor to the channel member.

* * * * *

US005127760A

United States Patent [19]

Brady

[11] Patent Number: 5,127,760

[45] Date of Patent: Jul. 7, 1992

[54] VERTICALLY SLOTTED HEADER

[76] Inventor: Todd A. Brady, 14656 La Miada St., Sherman Oaks, Calif. 91043

[21] Appl. No.: 557,755

[22] Filed: Jul. 26, 1990

[51] Int. Cl.[5] F16B 7/18; E04H 1/00

[52] U.S. Cl. 403/230; 403/262; 52/241

[58] Field of Search 403/2, 13, 230, 231, 403/262, 232.1, 241, 375, 116, 70; 52/210, 241, 573, 242, 238.1, 690; 256/67, 69

[56] References Cited

U.S. PATENT DOCUMENTS

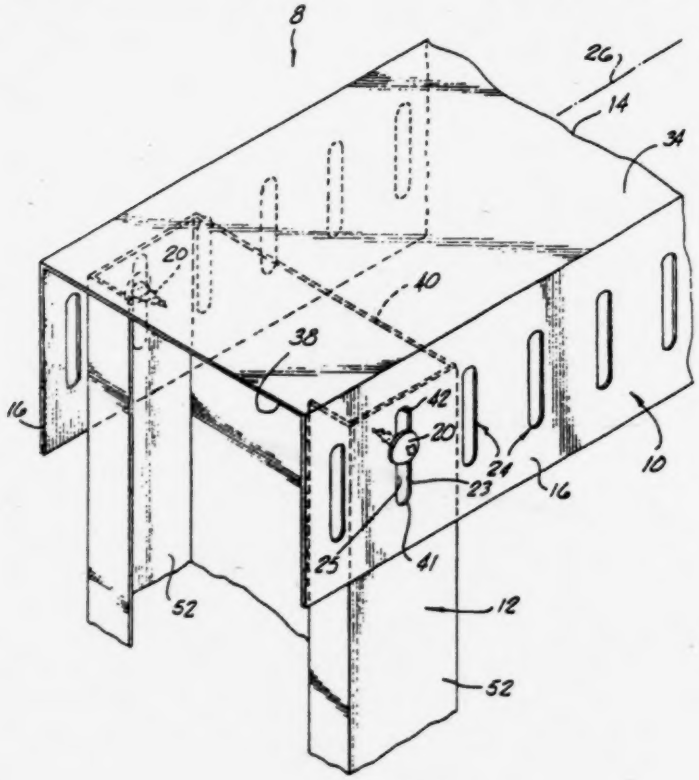
88,294	3/1869	Holmes	52/241
497,383	5/1893	Mela	52/348
2,020,502	11/1935	Goddard	52/238.1
2,056,328	10/1936	Price	52/243
2,058,386	10/1936	Parsons	52/241
2,063,010	12/1936	Balduf	52/144
2,235,761	3/1941	Goldsmith	52/690
2,245,644	6/1941	Braloff	52/241
2,745,277	5/1956	Nelsson	52/241
2,958,403	11/1960	Robertson	52/241
2,982,521	5/1961	Berish	403/230 X
2,990,092	7/1958	Hoffman	52/633
3,001,615	9/1961	Ries	403/230
3,008,550	11/1961	Miles	52/210
3,046,620	7/1962	Tvorik et al.	52/573
3,217,452	11/1965	Steele	52/241 X
3,305,993	2/1967	Nelsson	52/241
3,536,345	10/1970	Leifer	52/241 X
3,940,900	3/1976	Russo	52/656
3,958,372	5/1976	Benbow	52/36
4,409,765	10/1983	Pall	52/573 X
4,805,364	2/1989	Smolik	52/241
5,040,345	8/1991	Gilmour	52/241 X

Primary Examiner—Peter M. Cuomo

[57] ABSTRACT

A header of general U-shaped construction having a web and depending flanges normal to the web and separated by the web, and a stud, one end of which is interfitted between the flanges perpendicular to the web. The improvement comprising vertical slots formed in the flanges through which screws are passed uniting the header to the stud whereby the stud may move vertically with respect to the stud in response to environmental forces but not horizontally.

10 Claims, 2 Drawing Sheets



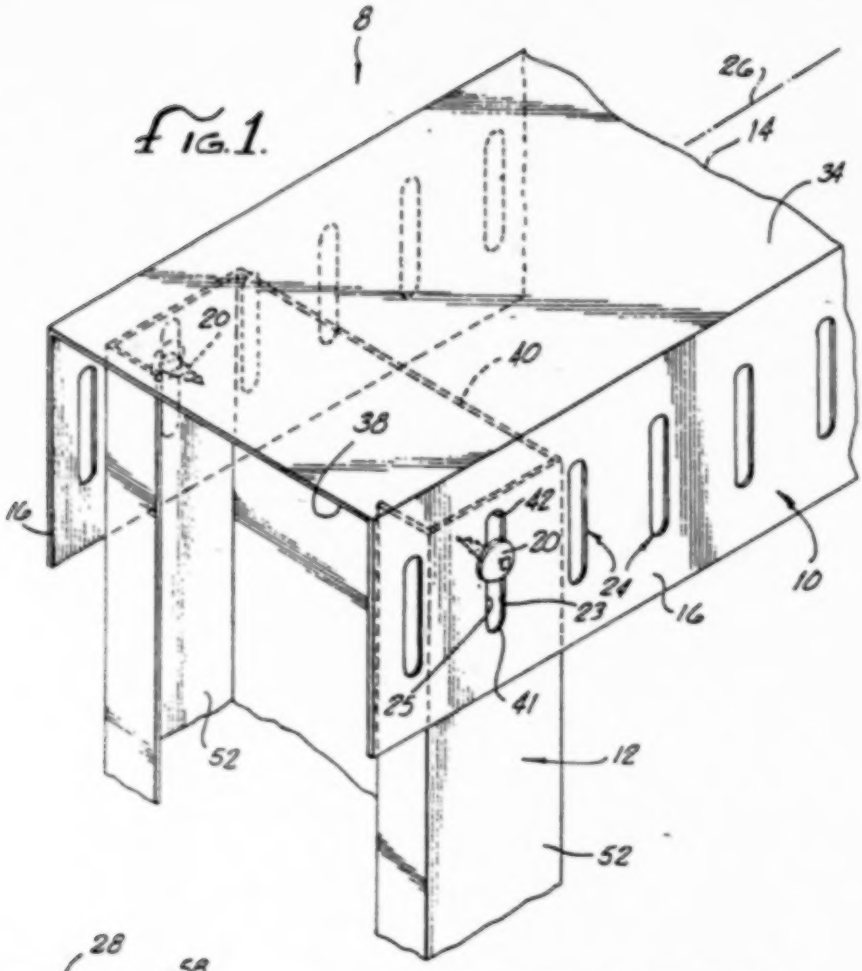


FIG. 1.

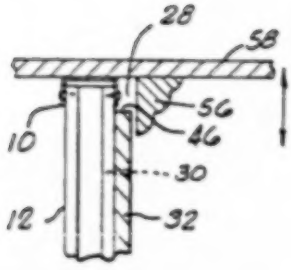


FIG. 5.

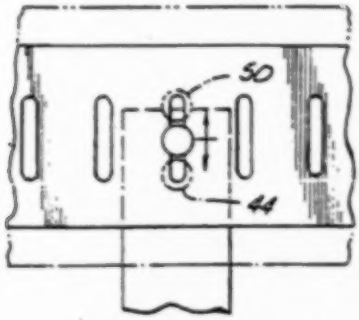
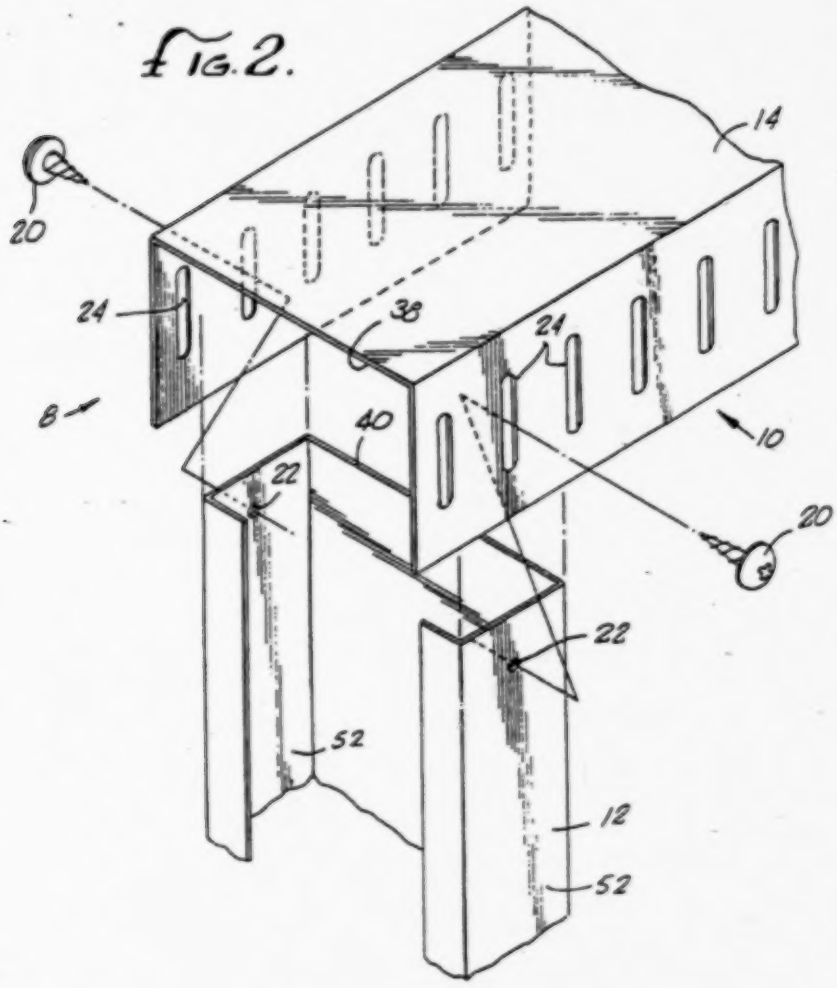


FIG. 4.

FIG. 2.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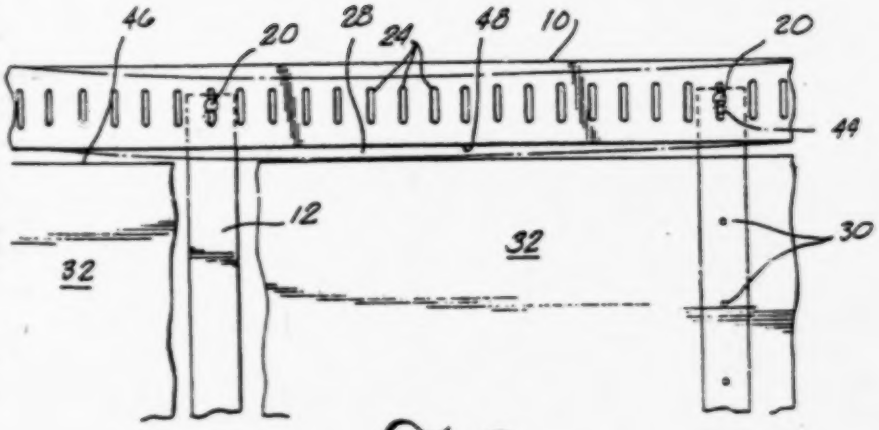
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FIG. 3.

VERTICALLY SLOTTED HEADER

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a building construction assembly and, more particularly, to a header for allowing horizontal, non-load bearing headers to vertically fluctuate in relationship to vertical, non-load/bearing wall studs to which the headers are attached. By allowing the header freedom of vertical movement, the walls that are fixed to the vertical studs are protected from cracking because the freedom of vertical movement of the header prevents translation of mechanical stresses to the walls caused by downward, environmental forces on the header.

2. Background Information

Prior to the present invention, vertical studs were secured to horizontal headers that secured all the studs in a wall together. The walls, frequently made out of wall board or plaster board, were secured to both the vertical studs and horizontal headers. Joists were usually secured to the top of the header at right angles to the vertical studs and at right angles to the horizontal header. The joists would then extend between the headers. The floor or roof would be secured to the top of the joists. This meant that the floor or roof was rigidly secured to the header which was rigidly secured to the studs. As a consequence, any downward environmental pressures on the floor or roof were translated directly into downward pressure on the the header. This would cause the studs to bow and would also result in the headers applying downward pressure on the wall directly. As a result, the environmental forces applied to the floor or ceiling would be translated into mechanical stress on the walls, which would result in cracks in the walls. The cracks would be further aggravated when the environmental pressure on the floor or ceiling was alleviated because the cracks would expand when the stress was relieved.

Examples of environmental stresses that cause the above kinds of problems are numerous. One of the most common examples involves the weight placed on the headers from the floors above. As a multi-story building is constructed, additional weight is placed on the headers of the lower floors as additional floors are added to the building. The present invention provides a means for the lower floors to absorb the additional stress.

Environmental stresses external to the building itself are also effectively managed by the present invention. For instance, in those parts of the country where it snows, the accummulation of snow fall on the roof can be a source of environmental pressure that will cause the cracking problem in the walls described above. In desert regions of the country, it is common for non-load bearing walls to be made out of metal studs and headers because of the shortage of readily available sources of lumber. In such hot regions of the country, the high temperatures cause the metal to expand. As a result, the wall board attached to the studs and headers is pulled with the expansion causing the walls to crack. The cooling of the metal studs and headers during the cool desert nights and re-expansion during the day aggravates the problem.

Earthquakes are another example of a source of environmental stress that can be managed by the present invention. Building construction technologies for surviving earthquakes are founded on the principle that the building should move with the earthquake. Rigid structures are more likely to suffer damage during an earthquake. The present invention helps prevent cracks in walls caused by earthquakes by permitting the nonload bearing frame to move with the earthquake. Obviously, the invention will not be very effective during a major quake. But for structures situated in earthquake zones that suffer frequent minor quakes, the invention can be of assistance in preventing cracks in the walls.

In addition, those parts of the country that are subject to severe tropical and sub-tropical weather systems, such as those states along the gulf coast, are subject to wide fluctuations in barometric pressure. In the extreme situation in the case of a hurricane, the difference between the barometric pressure on the inside of a house and the atmospheric pressure outside can become so great that the house will actually explode. While the present invention would be of little use in that extreme situation, it would help prevent cracking of the walls during less severe weather conditions that involve substantial fluctuations in barometric pressure.

Furthermore, the environmental pressures on the floors of public buildings can be substantial. For example, the floors of office buildings must support substantial additional weight during office hours as a result of the increased foot traffic. The present invention can accommodate the additional traffic during the day and flex back to its original position when the human load is absent. The prior art would have transferred such fluctuations in environmental pressures to the walls, which would have caused cracks over time. Moreover, the present invention can accommodate increased loads caused by the addition of office furniture and equipment, which the prior art could not without causing strain on and cracking of the walls.

SUMMARY OF THE INVENTION

It is the purpose of the present invention to provide a horizontal header with vertical slots with means for securing the header to vertical studs by way of the slots whereby said header can rise and fall in response to environmental forces applied to the the floor or roof.

Another object of the present invention is to provide a sufficient number of vertical slots spaced at predetermined distances from each other along the header so that studs can be secured to the header at the desired distances from each other depending upon the needs of the particular situation.

Another object of the present invention is to provide vertical slots in a header that permit vertical movement of the header while preventing horizontal movement.

Still another object of the present invention is to provide a means for securing the horizontal header to the vertical stud through the vertical slot in the header in such a way so that the securement means does not prevent vertical movement of the header.

These and other objects and advantages of the present invention will become apparent from the following detailed description of the preferred embodiment of the invention without intending to limit the scope of the invention which is set forth in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

The advantages of the invention can be more clearly understood by reference to the drawings in which:

FIG. 1 is a perspective view of a vertically slotted header secured to a vertical stud by means of a screw;

FIG. 2 is an exploded perspective view of FIG. 1;

FIG. 3 is a side elevational view of vertically slotted header secured to a vertical stud by means of a screw;

FIG. 4 is a side elevational view of the invention showing the highest, lowest and intermediate position of the header relative to the slot; and

FIG. 5 is an axial view of molding attached to a ceiling to conceal the space above the wall required by the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 illustrates a building construction assembly generally designated 8. The invention includes a header 10 of generally U shaped construction and a stud 12 also of generally U shaped construction. Preferrably, the header 10 and stud 12 are of metal construction as described in U.S. Pat. No. 4,235,054. While the header 10 and stud 12 are depicted as being U-shaped, it will be apparent that the invention is not limited by the shape of the header and stud. Said header 10 and said stud 12 are generally positioned perpendicular to each other with said header 10 in the horizontal position and said stud 12 in the vertical position.

Said header 10 is composed of a web 14 and depending flanges 16 that are bent normal to the plane of the web 14. Said flanges 16 are spaced apart the width of the web 14. Said header 10 is usually longer than it is wide. The flanges 16 of the header 10 are formed with slots 24 cut there through. The slots 24 are perpendicular to the longitudinal axis 26 of the header 10 and are vertically elongated. See FIG. 1.

In the preferred embodiment, the slots 24 are a-proximately 1.25 inches in length and 3/16 inches wide. The sots 24 each include a pair of generally parallel spaced apart sides 23 and 25. The slots terminate in a lower end 41 and an upper end 42. The lower end 41 and upper end 42 may be accurate to better accommodate attachment means 20 when the header 10 is in its maximum upperward position 50 and maximum downward position 44. See FIG. 4.

The width of the stud 12 is less than the distance between the flanges 16 so that the stud 12 can fit between the flanges 16. The slots 24 in the flanges 16 should be aligned so that each slot 24 in one flange 16 is in alignment with a slot on the opposite flange.

The preferred method for assembling the invention involves placing end 40 of stud 12 between flanges 16 so that the end 40 abuts against the bottom 30 of the web 14 such that the header 10 and the stud 12 are perpendicular to each other and a vertical slot 24 is generally centered on side 52 of the stud 12. Appropriate attachment means, such as a self-tapping screw 20, is positioned in the slot 24 midway between the bottom 41 of the slot 24 and the top 42 of the slot 24. Once positioned, the self-tapping screw 20 is drilled into the stud 12.

In another method of assembling the invention, holes 22 are pre-drilled in the stud 12. The stud 12 is then inserted between said flanges 16 so that the holes 22 in said stud are aligned with the slots 24. The attachment means 20 passes through the slot 24 and through the hole 22 in the stud 12. Said attachment means 20 is tightened down sufficiently to keep said header 10 and said stud 12 united, but not so tight as to prevent said header 10 from moving vertically in response to environmental forces as shown in FIGS. 3 and 4. This limitation with respect to the tension of the attachment means applies to all embodiments discussed herein.

The holes 22 in said stud 12 are positioned so that when the header 10 is forced downward to its maximum downward position 44 such that the top 42 of the slot 24 is abutted against said attachment means 20, then the top 40 of the stud 12 will contact the bottom 38 of the web 14 of the header 10. If the holes 22 in said stud 12 are positioned too close to the top 40 of the stud 12, then the attachment means will are the full force of any downward pressure on said header 10. This may shorten the lift expectancy of the invention.

If the holes 22 in said stud 12 are positioned too far from the top 40 of the stud 12, then the bottom 38 of the web 14 will abut against the top 40 of the stud 12 before the header 10 has reached tits maximum upward position 50 in the slot 24. In that case, the full vertical range of motion the invention is not being fully utilized.

In order to complete the structure, wall construction material, such as wall board 32, is affixed to the studs in a conventional matter such as by wall board screws 30. It is critical that the wall 32 is attached to the studs 12 and not the header 10, which was done in the prior art. Otherwise, the movement of the header 12 would stress the walls 32, which would defeat the purpose of the invention. It is also important that the walls 32 stop short of the header 12 so that space 28 remains between the top 46 of the wall 32 and the bottom 48 of the flange 16 of the header 12. For aesthetic purposes, molding 56 may extend from the ceiling 58 to cover the space 28 above the top 46 of he wall 32.

The invention and its attendant advantages will be understood from the foregoing description and it swill be apparent that various changes may be made without departing from the spirit of the invention.

I claim:

1. A building construction assembly that includes a header and a stud wherein the header is capable of vertical movement relative to said assembly comprising:

a header having a web and flanges with said flanges connected to said web;

at least one of said flanges having at least one vertical slot therein;

a stud having a width less than the distance between said flanges of said header and having a top end;

said stud having at least one hole formed therein proximal to said top end;

said top end fitting between said flanges perpendicular to said header positioned so that said hole is aligned with said vertical slot; and

an attachment means passing through said slot and through said hole to slideably unite said header to said stud whereby said slot permits said header to move vertically with respect to said stud while restricting horizontal movement of said header.

2. The building construction assembly of claim 1 wherein sat least one of said flanges has a plurality of vertical slots.

3. The building construction assembly of claim 1 wherein each of said flanges has a plurality of vertical slots.

4. The building construction assembly of claim 1 wherein said attachment means is a screw passing through said slot into said stud; and

said screw biasing said header to said stud yet spaced from said header sufficiently to allow vertical movement of said header with respect to said stud.

5. The building construction assembly of claim 1 wherein said header and said stud are made of steel.

6. The building construction assembly of claim 1 wherein:

said slot has an upper end;

said web of said header has a bottom surface; and,

said hole formed in said stud is located so that said top end of said header is in constant with said bottom surface of said web when said attachment means is in contact with said upper end of said slot.

7. A building construction assembly that includes a header and a stud wherein the header is capable of vertical movement relative to said assembly comprising:

a header having a web with a bottom surface and having flanges with said flanges connected to said web;

at least one of said flanges having at least one vertical sot therein with said slot having an upper end;

a stud having a width less tan the distance between said flanges of said header and having a top end;

said stud having at least one hole formed therein proximal to said top end;

said to pend fitting between said flanges perpendicular to said header positioned so that said hole is aligned with said vertical slot;

an attachment means passing through said slot and through said hole to slideably unite said header to said stud whereby said slot permits said header to move vertically with respect to said stud while restricting horizontal movement of said header; and

said hole formed in said stud located so that said top nd of said header is in contact with said bottom surface of said web when said attachment means is in contact with said upper end of said slot.

8. The building construction assembly of claim 7 wherein at least one of said flanges has a plurality of elongated slotted passages.

9. The building construction assembly of claim 7 wherein each of said flanges has a plurality of elongated slotted passages.

10. The building construction assembly of claim 7 wherein said header and said stud are made of st•el.

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SPECIFICATION

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VERTICALLY SLOTTED HEADER

BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION.

This invention relates to a building construction assembly and, more particularly, to a header for allowing horizontal, non-load bearing headers to vertically fluctuate in relationship to vertical, non-load bearing wall studs to which the headers are attached. By allowing the header freedom of vertical movement, the walls that are fixed to the vertical studs are protected from cracking because the freedom of vertical movement of the header prevents translation of mechanical stresses to the walls caused by downward, environmental forces on the header.

2. BACKGROUND ~~OF THE INVENTION.~~ INFORMATION

Prior to the present invention, vertical studs were secured to horizontal headers that secured all the studs in a wall together. The walls, frequently made out of wall board or plaster board, were secured to both the vertical studs and horizontal headers. Joists were usually secured to the top of the header at right angles to the vertical studs and at right angles to the horizontal header. The joists would then extend between the headers. The floor or roof would be secured to the top of the joists. This meant that the floor or roof was rigidly secured to the header which was rigidly secured to the studs. As a consequence, any downward environmental pressures on the floor or roof were

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translated directly into downward pressure on the the header. This would cause the studs to bow and would also result in the headers applying downward pressure on the wall directly. As a result, the environmental forces applied to the floor or ceiling would be translated into mechanical stress on the walls, which would result in cracks in the walls. The cracks would be further aggravated when the environmental pressure on the floor or ceiling was alleviated because the cracks would expand when the stress was relieved.

Examples of environmental stresses that cause the above kinds of problems are numerous. One of the most common examples involves the weight placed on the headers from the floors above. As a multi-story building is constructed, additional weight is placed on the headers of the lower floors as additional floors are added to the building. The present invention provides a means for the lower floors to absorb the additional stress.

Environmental stresses external to the building itself are also effectively managed by the present invention. For instance, in those parts of the country where it snows, the accummulation of snow fall on the roof can be a source of environmental pressure that will cause the cracking problem in the walls described above. In desert regions of the country, it is common for non-load bearing walls to be made out of metal studs and headers because of the shortage of readily available sources of lumber. In such hot regions of the country, the high temperatures cause the metal to expand. As a result, the wall board attached to the studs and headers is pulled with the expansion causing the walls to crack.

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The cooling of the metal studs and headers during the cool desert nights and re-expansion during the day aggravates the problem.

Earthquakes are another example of a source of environmental stress that can be managed by the present invention. Building construction technologies for surviving earthquakes are founded on the principle that the building should move with the earthquake. Rigid structures are more likely to suffer damage during an earthquake. The present invention helps prevent cracks in walls caused by earthquakes by permitting the nonload bearing frame to move with the earthquake. Obviously, the invention will not be very effective during a major quake. But for structures situated in earthquake zones that suffer frequent minor quakes, the invention can be of assistance in preventing cracks in the walls.

In addition, those parts of the country that are subject to severe tropical and sub-tropical weather systems, such as those states along the gulf coast, are subject to wide fluctuations in barometric pressure. In the extreme situation in the case of a hurricane, the difference between the barometric pressure on the inside of a house and the atmospheric pressure outside can become so great that the house will actually explode. While the present invention would be of little use in that extreme situation, it would help prevent cracking of the walls during less severe weather conditions that involve substantial fluctuations in barometric pressure.

Furthermore, the environmental pressures on the floors of public buildings can be substantial. For example, the floors of office buildings must support substantial additional weight during

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office hours as a result of the increased foot traffic. The present invention can accommodate the additional traffic during the day and flex back to its original position when the human load is absent. The prior art would have transferred such fluctuations in environmental pressures to the walls, which would have caused cracks over time. Moreover, the present invention can accommodate increased loads caused by the addition of office furniture and equipment, which the prior art could not without causing strain on and cracking of the walls.

3. SUMMARY OF THE INVENTION:

It is the purpose of the present invention to provide a horizontal header with vertical slots with means for securing the header to vertical studs by way of the slots whereby said header can rise and fall in response to environmental forces applied to the the floor or roof.

Another object of the present invention is to provide a sufficient number of vertical slots spaced at predetermined distances from each other along the header so that studs can be secured to the header at the desired distances from each other depending upon the needs of the particular situation.

Another object of the present invention is to provide vertical slots in a header that permit vertical movement of the header while preventing horizontal movement.

Still another object of the present invention is to provide a means for securing the horizontal header to the vertical stud through the vertical slot in the header in such a way so that the securement means does not prevent vertical movement of the header.

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These and other objects and advantages of the present invention will become apparent from the following detailed description of the preferred embodiment of the invention without intending to limit the scope of the invention which is set forth in the appended claims.

4. BRIEF DESCRIPTION OF THE DRAWINGS.

The advantages of the invention can be more clearly understood by reference to the drawings in which:

Figure 1 is a perspective view of a vertically slotted header secured to a vertical stud by means of a screw;

Figure 2 is an exploded perspective view of Figure 1;

Figure 3 is a side elevational view of vertically slotted header secured to a vertical stud by means of a screw;

Figure 4 is a side elevational view of the invention showing the highest, lowest and intermediate position of the header relative to the slot; and

Figure 5 is an axial view of molding attached to a ceiling to conceal the space above the wall required by the invention.

5. DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT:

Figure 1 illustrates a building construction assembly generally designated 8. The invention includes a header 10 of generally U shaped construction and a stud 12 also of generally U shaped construction. Preferrably, the header 10 and stud 12 are of metal construction as described in United States Patent No. 4,235,054. While the header 10 and stud 12 are depicted as being U-shaped, it will be apparent that the invention is not limited by the shape of the header and stud. Said header 10 and said stud 12

are gernerally positioned perpendicular to each other with said header 10 in the horizontal position and said stud 12 in the vertical position.

Said header 10 is composed of a web 14 and depending flanges 16 that are bent normal to the plane of the web 14. Said flanges 16 are spaced apart the width of the web 14. Said header 10 is usually longer than it is wide. The flanges 16 of the header 10 are formed with slots 24 cut there through. The slots 24 are perpendicular to the longitudinal axis 26 of the header 10 and are vertically elongated. See Figure 1.

In the preferred embodiment, the slots 24 are approximately 1.25 inches in length and 3/16 inches wide. The slots 24 each include a pair of generally parallel spaced apart sides 23 and 25. The slots terminate in a lower end 41 and an upper end 42. The lower end 41 and upper end 42 may be arcuate to better accommodate attachment means 20 when the header 10 is in its maximum upperward position 50 and maximum downward position 44. See Figure 4.

The width of the stud 12 is less than the distance between the flanges 16 so that the stud 12 can fit between the flanges 16. The slots 24 in the flanges 16 should be aligned so that each slot 24 in one flange 16 is in alignment with a slot on the opposite flange.

The preferred method for assembling the invention involves placing end 40 of stud 12 between flanges 16 so that the end 40 abuts against the bottom 30 of the web 14 such that the header 10 and the stud 12 are perpendicular to each other and a vertical slot 24 is generally centered on side 52 of the stud 12. Appropriate

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attachment means, such as a self-tapping screw 20, is positioned in the slot 24 midway between the bottom 41 of the slot 24 and the top 42 of the slot 24. Once positioned, the self-tapping screw 20 is drilled into the stud 12.

In another method of assembling the invention, holes 22 are pre-drilled in the stud 12. The stud 12 is then inserted between said flanges 16 so that the holes 22 in said stud are aligned with the slots 24. The attachment means 20 passes through the slot 24 and through the hole 22 in the stud 12. Said attachment means 20 is tightened down sufficiently to keep said header 10 and said stud 12 united, but not so tight as to prevent said header 10 from moving vertically in response to environmental forces as shown in Figures 3 and 4. This limitation with respect to the tension of the attachment means applies to all embodiments discussed herein.

The holes 22 in said stud 12 are positioned so that when the header 10 is forced downward to its maximum downward position 44 such that the top 42 of the slot 24 is abutted against said attachment means 20, then the top 40 of the stud 12 will contact the bottom 38 of the web 14 of the header 10. If the holes 22 in said stud 12 are positioned too close to the top 40 of the stud 12, then the attachment means will bare the full force of any downward pressure on said header 10. This may shorten the life expectancy of the invention.

If the holes 22 in said stud 12 are positioned too far from the top 40 of the stud 12, then the bottom 38 of the web 14 will abut against the top 40 of the stud 12 before the header 10 has reached its maximum upward position 50 in the slot 24. In that

case, the full vertical range of motion of the invention is not being fully utilized.

In order to complete the structure, wall construction material, such as wall board 32, is affixed to the studs in a conventional matter such as by wall board screws 30. It is critical that the wall 32 is attached to the studs 12 and not the header 10, which was done in the prior art. Otherwise, the movement of the header 12 would stress the walls 32, which would defeat the purpose of the invention. It is also important that the walls 32 stop short of the header 12 so that a space 28 remains between the top 46 of the wall 32 and the bottom 48 of the flange 16 of the header 12. For aesthetic purposes, molding 56 may extend from the ceiling 58 to cover the space 28 above the top 46 of the wall 32.

The invention and its attendant advantages will be understood from the foregoing description and it will be apparent that various changes may be made without departing from the spirit of the invention.

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I claim:

1. A building construction assembly that includes a header and a stud wherein the header is capable of vertical movement relative to said stud comprising:

a header having a web and flanges with said flanges connected to said web;

at least one of said flanges having at least one vertical slot therein;

a stud having a width less than the distance between said flanges of said header;

said stud being aligned with said vertical slot; and

an attachment means passing through said slot to unit said header to said stud whereby said slot permits said header to move vertically with respect to said stud while restricting horizontal movement of said header.

2. The building construction assembly of claim 1 wherein at least one of said flanges has a plurality of vertical slots.

3. The building construction assembly of claim 1 wherein each of said flanges has a plurality of vertical slots.

4. The building construction assembly of claim 1 wherein said attachment means is a screw passing through said slot into said stud; and

said screw biasing said header to said stud ~~without~~ yet spaced from said header sufficiently to allow vertical movement of said header with respect to said stud.

5. The building construction assembly of claim 1 wherein said header and said stud are made of steel.

6. In a building structure utilizing an inverted generally U shaped header member superimposed over a plurality of vertical studs wherein said header is adapted to be united with said studs and wherein said header includes a pair of spaced apart generally parallel flanges with a web therebetween, said web having a width corresponding to the width of said studs, the improvement comprising:

at least one elongated slotted passage vertically formed in at least one flange, with said passage aligned with said stud;

fastening means passing through said slotted passage and fixedly secured to said stud; and

said fastening means tensioned against said flange enough to maintain said header and said stud in said united position while allowing restricted vertical movement of said header relative to said stud in response to environmental forces.

7. The building construction assembly of claim 6 wherein at least one of said flanges has a plurality of elongated slotted passages.

8. The building construction assembly of claim 6 wherein each of said flanges has a plurality of elongated slotted passages.

9. The building construction assembly of claim 6 wherein said header and said stud are made of steel.

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ABSTRACT

A header of general U-shaped construction having a web and depending flanges normal to ~~said~~ the web and separated by ~~said~~ the web, and a stud, one end of which is interfitted between ~~said~~ the flanges perpendicular to ~~said~~ the web. The improvement comprising vertical slots formed in ~~said~~ the flanges through which ~~attachment means~~ screws are passed uniting ~~said~~ the header to ~~said~~ the stud whereby ~~said~~ the stud may move vertically with respect to ~~said~~ the stud in response to environmental forces but not horizontally.

Attorney Docket 12-449

07/557755

DECLARATION FOR PATENT APPLICATION

As the below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name; I believe that I am the original, first and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled

"VERTICALLY SLOTTED HEADER"

the specification of which is attached hereto. I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims. I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: I hereby appoint as my attorneys, with full powers of substitution and revocation, to prosecute this application and transact all business in the United States Patent and Trademark Office connected therewith:

HARLAN P. HUEBNER, Reg. No. 20,326 301

R. JOSEPH TROJAN, Reg. No. P 34,264

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City (Zip)	City (Zip)
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State or Country	State or Country
California CA	U.S.A
Date	Signature
X July 1, 1990	Todd Brady

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Applicant or Patentee: Todd Allen Brady
Serial or Patent No.: _____
Filed or Issued: _____
For: VERTICALLY SLOTTED HEADER

Attorney's Docket No.: 12-449

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS (37 CFR 1.9(f) and 1.27(b)) - INDEPENDENT INVENTOR

As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees under section 41(a) and (b) of Title 35, United States Code, to the Patent and Trademark Office with regard to the invention entitled Vertically Slotted Header described in

[X] the specification filed herewith.
[ ] application serial no. _____, filed _____.
[ ] patent no. _____, issued _____.

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

[X] no such person, concern, or organization
[ ] persons, concerns or organizations listed below*

*NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

FULL NAME _____
ADDRESS _____
[ ] INDIVIDUAL [ ] SMALL BUSINESS CONCERN [ ] NONPROFIT ORGANIZATION

FULL NAME _____
ADDRESS _____
[ ] INDIVIDUAL [ ] SMALL BUSINESS CONCERN [ ] NONPROFIT ORGANIZATION

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I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

Todd Allen Brady

NAME OF INVENTOR	NAME OF INVENTOR	NAME OF INVENTOR
X Todd Brady		
Signature of Inventor	Signature of Inventor	Signature of Inventor
X July 1, 1990		
Date	Date	Date

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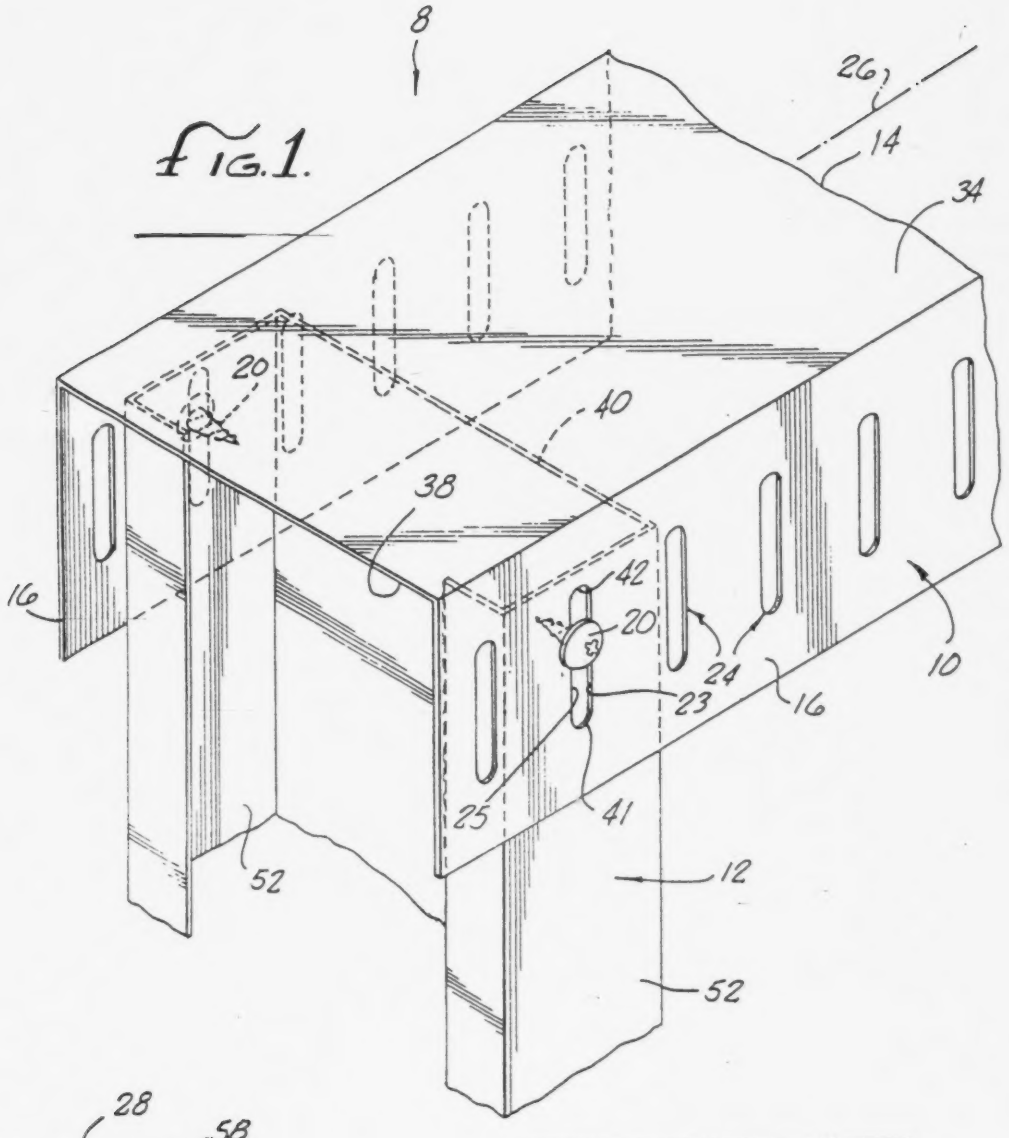
FIG. 1.



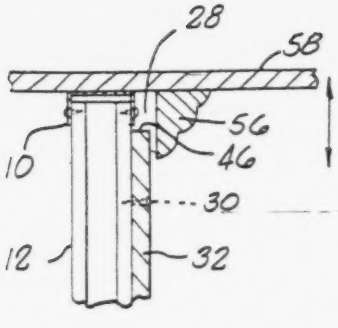


FIG. 5.

FIG. 4.

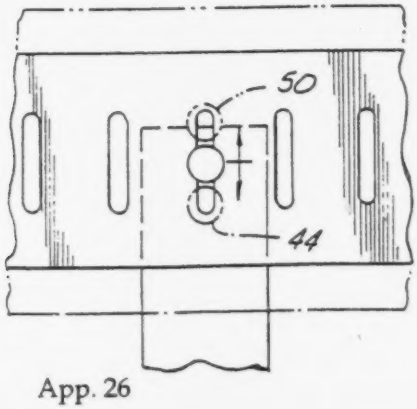


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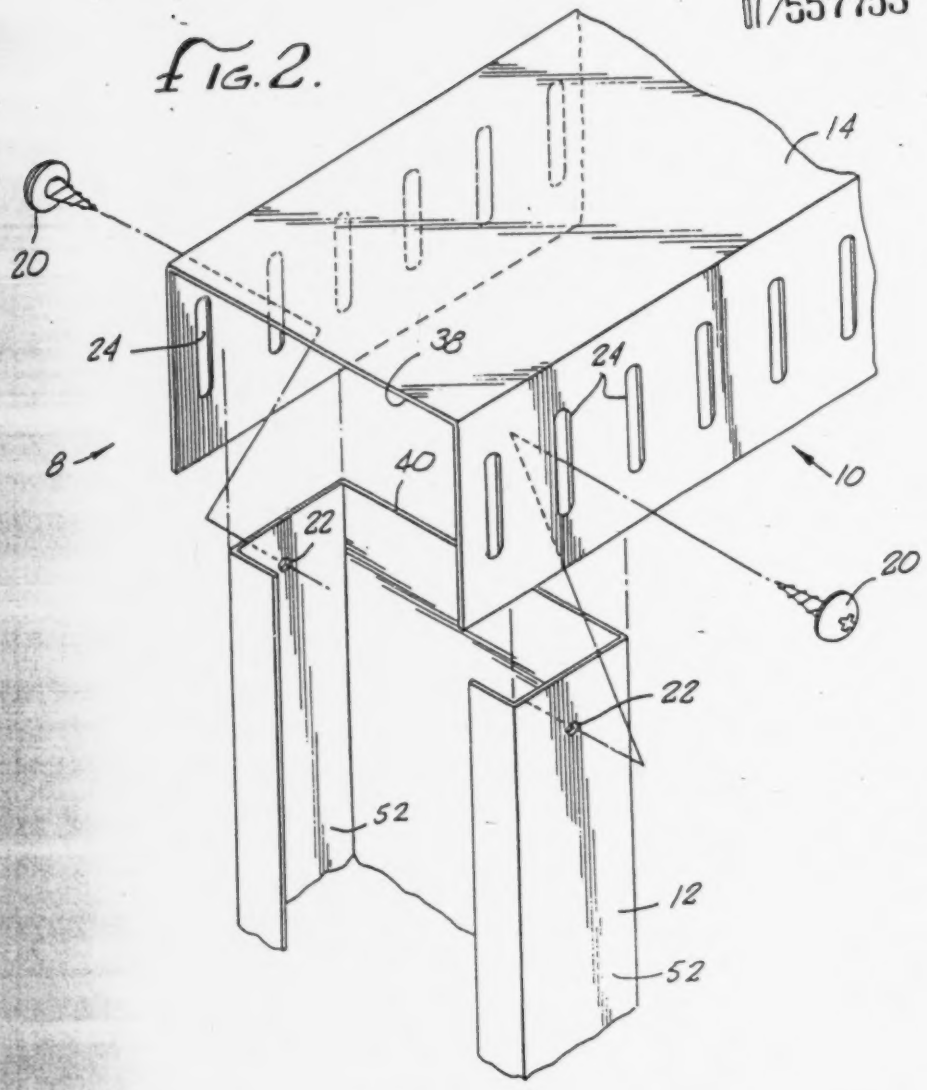
FIG. 2.



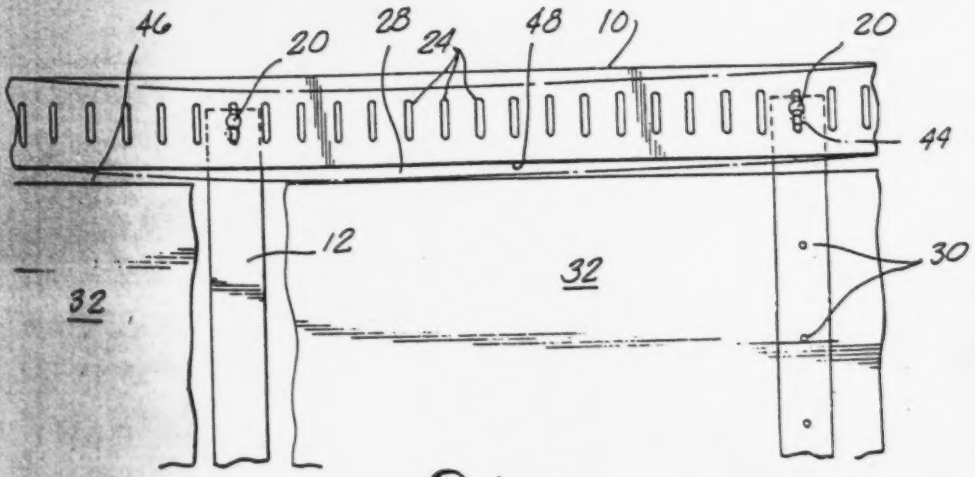


FIG. 3.